

What is claimed is:

1. A computer system to assess a condition of a biological specimen by studying physical traits of a sample comprising a number of biological specimens, the system comprising:

a user interface comprising a computer screen, an input interface, and a user interface portion of a processing mechanism;

the user interface comprising a specimen information input mechanism, the specimen information input mechanism comprising an association input to associate certain samples with a test population of biological specimens and other samples with a reference population of biological specimens;

an imaging system to identify changes in visible features of the specimens of the sample, the changes in visible features comprising physical trait data indicative of physical traits of the specimens; and

data storage comprising sample data and the physical trait data corresponding to the sample.

2. The computer system according to claim 1, wherein the physical trait data comprises movement trait data regarding individual biological specimens.

3. The computer system according to claim 2, wherein the movement trait data is selected from the group consisting of X-pos, X-speed, speed, turning, stumbling, size, T-count, P-count, T-length, Cross150, Cross250, and F-count.

4. The computer system according to claim 2, further comprising an animation mechanism to create a graphically represented animation of positions and movements of the individual biological specimens.

5. The computer system according to claim 1, wherein the specimen information input further comprises a grouping input to associate certain samples with each other.

6. The computer system according to claim 1, wherein the biological specimen comprises an animal.
7. The computer system according to claim 1, wherein the biological specimen comprises a fly.
8. The computer system according to claim 1, wherein the biological specimen comprises drosophila.
9. The computer system according to claim 1, wherein the condition comprises a human central nervous system condition and wherein the biological specimens comprise live transgenic non-human animals.
10. The computer system according to claim 1, wherein the specimen information input mechanism comprises a sample identification mechanism to automatically identify each sample by assigning an identifier associated with a location of placement of the sample.
11. The computer system according to claim 1, wherein the specimen information input mechanism comprises a sample identification mechanism to identify each sample with a bar code.
12. The computer system according to claim 1, wherein the specimen information input mechanism comprises a sample identification mechanism to allow a user to input an identification of each sample through computer screen input.
13. The computer system according to claim 1, wherein the specimen information input mechanism comprises an animal type input to allow a user to specify through computer screen input the type of biological specimen to be studied.
14. The computer system according to claim 1, wherein the user interface further comprises a physical trait input mechanism to allow a user to specify through computer screen input a set of physical traits of the sample to be analyzed.
15. The computer system according to claim 1, wherein the imaging system comprises a motion tracking system to track motion of the biological specimens within the

sample and produce motion information, and to produce, from the motion information, behavioral trait data concerning the sample.

16. The computer system according to claim 1, wherein said data storage further comprises physical trait data corresponding to each biological specimen.

17. The computer system according to claim 1, wherein said data storage comprises sample data.

18. The computer system according to claim 1, wherein the type of specimen comprises information concerning a transgenic alteration of the biological specimen.

19. The computer system according to claim 1, wherein the specimen information input mechanism comprises a number input mechanism to input a number of samples to be assessed by the computer system, the number input mechanism being configured to receive computer screen input by a user of numbers at least as high as one hundred (100).

20. The computer system according to claim 1, wherein the specimen input mechanism comprises a imaging-based counter to count a number of specimens in the sample using an image of the sample.

21. The computer system according to claim 1, further comprising:  
a first input mechanism to identify through a computer screen input a test biological specimen population;

a second input mechanism to identify through a computer screen input a reference biological specimen population;

a trait determining mechanism to cause the motion tracking system to produce test physical trait data concerning the test biological specimen population and to produce reference physical trait data concerning the reference biological specimen population;

a comparison mechanism to compare a chosen portion of the test physical trait data to a corresponding chosen portion of the reference physical trait data to produce a comparison result.

22. The computer system according to claim 20, wherein the chosen portion of the test physical trait data comprises all the test physical trait data and wherein the corresponding chosen portion of the reference physical trait data comprises all the reference physical trait data.

23. The computer system according to claim 20, wherein the chosen portion of the test physical trait data comprises substantially less than all the test physical trait data and wherein the corresponding chosen portion of the reference physical trait data comprises substantially less than all the reference physical trait data.

24. The computer system according to claim 22, wherein the system further comprises an analyzing mechanism to analyze the comparison result to assess an extent to which the chosen portion of the test physical trait data and the corresponding chosen portion of the reference physical trait data correlate to information about a human central nervous system condition.

25. The computer system according to claim 22, wherein the system further comprises an analyzing mechanism to analyze the comparison result to make an assessment regarding a treatment made to the test population and not made to the reference population.

26. The computer system according to claim 22, wherein the system further comprises an analyzing mechanism to analyze the comparison result to make an assessment regarding whether the test population has a human central nervous system disease known not to exist in the reference population.

27. The computer system according to claim 6, wherein the physical trait data comprises behavior traits of the animals.

28. The computer system according to claim 20, further comprising an analyzing mechanism to analyze the comparison result to make an assessment regarding a treatment made to the test population and not made to the reference population, the analysis of the comparison result comprising determining when a difference between data from the trait data of the test population and data from the trait data of the reference population is over a specified threshold, the analyzing mechanism comprising a decision mechanism to decide that the treatment is effective in mitigating or preventing a central nervous system condition.

29. The computer system according to claim 1, further comprising:

the user interface comprising a condition type input mechanism to allow a user to specify, through computer screen input, a specific central nervous system condition to be analyzed;

the user interface further comprising an image collection input mechanism to allow a user to specify, through computer screen input, how image data is collected and a duration over which the image data is to be collected;

the user interface further comprising a sample configuration input mechanism to allow a user to specify, through computer screen input, a number of specimens to be assessed; and

the user interface further comprising an specimen population identification input mechanism to allow a user to enter, through a computer screen input, an identification number for each specimen population comprising specimens to be tracked.

30. The computer system according to claim 1, where the specimen information input mechanism comprises a mechanism to present to the user on a computer screen a list of possible animal populations from which the user can choose a specimen population using the input interface.

31. The computer system according to claim 29, wherein the input interface comprises a keyboard and a cursor control device.

32. The computer system according to claim 30, wherein the cursor control device comprises a mouse.

33. The computer system according to claim 28, wherein the condition type input mechanism allows the user to choose a specific central nervous system disease and enter a set of physical traits relating to the disease.

34. The computer system according to claim 28, wherein the condition type input mechanism allows the user to enter a set of physical traits without specifying a central nervous system condition.

35. The computer system according to claim 28, wherein the imaging system comprises a calculating mechanism to calculate physical traits including path length.

36. The computer system according to claim 28, wherein the imaging system comprises a calculating mechanism to calculate physical traits including velocity.

37. The computer system according to claim 28, wherein the imaging system comprises a calculating mechanism to calculate physical traits including turning.

38. The computer system according to claim 28, wherein the imaging system comprises a calculating mechanism to calculate physical traits including stumbling.

39. A computer system to assess a human central nervous system condition by studying physical traits of a sample comprising a number of biological specimens, the system comprising:

a user interface comprising a computer screen, an input interface, and a user interface portion of a processing mechanism;

the user interface comprising an specimen information input mechanism, comprising an specimen information input to allow a user to specify through computer screen input information about the specimen to be studied;

a motion tracking system to track motion of the specimens within the sample and produce motion information, and to produce, from the motion information, physical trait data concerning a set of physical traits;

the user interface further comprising a physical trait subset input mechanism to allow a user to specify through computer screen input a subset of physical traits of the sample to be used in assessing a human central nervous system, the subset of physical traits being a subset of the set of physical traits; and

data storage comprising sample data and the produced physical trait data corresponding to the sample data.

40. A computer interface for a system to assess a human central nervous system condition by studying physical traits of a sample comprising a number of biological specimens, the computer interface comprising:

a user interface comprising a computer screen, an input interface, and a user interface portion of a processing mechanism;

the user interface comprising an specimen information input mechanism, comprising an specimen information input to allow a user to specify through computer screen input information about the specimen to be studied; and

the user interface further comprising a physical trait subset input mechanism to allow a user to specify through computer screen input a subset of physical traits of the sample to be used in assessing a human central nervous system, the subset of physical traits being a subset of the set of physical traits.

41. A machine-readable media encoded with information, the information when read by a machine causing a machine to:

receive from a user, through computer screen input, information regarding a specimen to be studied, the specimen being one of a sample of non-human biological specimens for assessment of a human central nervous system condition by studying physical traits of the specimen;

cause a motion tracking system to track motion of the specimens within the sample and produce motion information, and to produce, from the motion information, physical trait data concerning a set of physical traits; and

receive from a user, through computer screen input, a subset of physical traits of the sample to be used in assessing a human central nervous system, the subset of physical traits being a subset of a set of physical traits determined by the motion tracking system and stored in a data storage.